IN THE CLAIMS

The claims are amended as follows:

1. (original) A method for three dimensional phase unwrapping for use in magnetic resonance imaging comprising:

a) selecting a voxel of interest from a plurality of voxels in a volume of interest of a magnetic resonance phase wrapped image, wherein the voxel of interest has a predetermined phase value;

b) identifying neighboring voxels in a neighborhood of the voxel of interest wherein each of the neighboring voxels has a respective phase value;

c) adjusting the respective phase values of the neighboring voxels to correct for phase jumps, wherein each of the neighboring voxels is assigned a respective adjusted phase value;

d) determining respective absolute phase difference values corresponding to each of respective neighboring voxels;

e) sorting the respective absolute phase difference values to select a smallest absolute phase difference value;

f) tagging the voxel of interest as visited voxel;

g) tagging the neighboring voxels as visited voxels;

h) selecting a new voxel of interest corresponding to the smallest absolute phase difference value;

i) identifying new neighboring voxels in the neighborhood of the new voxel of interest;

j) repeating steps c through i in successive iterations until all voxels in the volume of interest have been tagged as visited voxels, wherein the neighboring voxels are new neighboring voxels in the successive iterations and wherein the voxel of interest is the new voxel of interest in the successive iterations; and

k) displaying a phase unwrapped image.

2. (original) The method of claim 1, wherein adjusting the neighboring voxels to correct for phase jumps comprises:

calculating a phase difference value for each respective neighboring voxel, wherein the phase difference value is the difference in phase value of the respective neighboring voxel and the voxel of interest;

adding 2Π to the phase value of the neighboring voxel, if the respective phase difference value corresponding to the respective neighboring voxel is less than $-\Pi$;

subtracting 2Π from the phase value of the neighboring voxel, if the respective phase difference value corresponding to the respective neighboring voxel is greater than Π; and

making no change to the phase value of the neighboring voxel, if the respective phase difference value corresponding to the neighboring voxel is between $-\Pi$ to $+\Pi$.

3. (original) The method of claim 1, wherein the respective absolute phase difference value comprises an absolute difference between the phase value of each of the respective neighboring voxel and the phase value of the voxel of interest.

4. (original) The method of claim 1, wherein a first iteration comprises selecting six neighboring voxels in the neighborhood of voxel of interest.

5. (original) The method of claim 1, wherein selecting the voxel of interest comprises selecting a respective voxel only once as the voxel of interest.

6. (original) The method of claim 1 further comprising excluding adjusting phase values of the neighboring voxels tagged as visited voxels in successive iterations.

7. (original) The method of claim 1 further comprising storing the adjusted phase values of the neighboring voxels.

8. (original) The method of claim 1 further comprising storing the respective absolute phase difference values.

9. (original) A phase unwrapped image created by the method of claim 1.

10. (original) A method for iteratively adjusting phase values of voxels in a volume of interest of a three dimensional magnetic resonance phase wrapped image to correct for phase jumps comprising:

selecting a voxel of interest in the volume of interest;

identifying neighboring voxels in a neighborhood of the voxel of interest;

calculating a phase difference value for each respective neighboring voxel, wherein the phase difference value is the difference in phase value of a respective neighboring voxel and the voxel of interest;

adding 2Π to the phase value of the neighboring voxel, if the respective phase difference value corresponding to the respective neighboring voxel is less than $-\Pi$;

subtracting 2Π from the phase value of the neighboring voxel , if the respective phase difference value corresponding to the respective neighboring voxel is greater than Π; and

making no change to the phase value of the neighboring voxel, if the respective phase difference value corresponding to the neighboring voxel is between $-\Pi$ to $+\Pi$.

11. (original) The method of claim 10, wherein successive iterations comprise selecting the voxel of interest based on a lowest absolute phase difference value.

12. (original) The method of claim 10, wherein a first iteration comprises identifying six neighboring voxels in the neighborhood of the voxel of interest.

13. (original) A phase unwrapped image created by the method of claim 10.

14. (cancelled).

15. (currently amended) A magnetic resonance imaging system comprising:

a set of gradient coils for producing controlled gradient field;

a radio frequency coil for applying excitation signals to a subject of interest;

a detecting coil for detecting magnetic resonance signals resulting from the excitation signals; and

a control circuitry configured to energize the set of gradient coils, the radio frequency coil and to obtain a three dimensional phase wrapped image from the magnetic resonance signals detected by the detecting coils, and the control circuitry comprising a phase unwrap component to perform phase unwrapping in a volume of interest of the phase wrapped image to obtain a phase unwrapped image,

~~The imaging system of claim 14,~~wherein the phase unwrap component comprises:

a volume of interest selector to select the volume of interest from the wrapped image;

a voxel of interest selector to select successively voxels of interest from a plurality of voxels in the volume of interest, wherein each voxel of interest comprises a corresponding phase value;

a neighborhood identifier to identify neighboring voxels in a neighborhood of the voxel of interest, wherein each neighboring voxel comprises a respective phase value;

a phase adjustment component to adjust the respective phase values of the neighboring voxels to correct for phase jumps; wherein each of the neighboring voxels is assigned a respective adjusted phase value;

an absolute phase difference determiner to determine respective absolute phase difference values corresponding to each of respective neighboring voxels;

a sort and select component to sort the absolute phase difference values and to select a minimum absolute phase difference value; and

a tagging component to tag the voxel of interest and the neighboring voxels at an end of each iteration as visited voxels, wherein the phase unwrap component is configured to undertake a plurality of iterations till all voxels in the volume of interest are tagged as visited voxels.

16. (original) The imaging system of claim 15, wherein the voxel of interest selector selects a new voxel of interest in each iteration, wherein the new voxel of interest corresponds to the minimum absolute phase difference value selected by the sort and select component.

17. (original) The imaging system of claim 15 further comprising a first storage component to store the voxels with adjusted phase values.

18. (original) The imaging system of claim 15 further comprising a second storage component to store absolute phase difference values.

19. (original) The imaging system of claim 17 further comprising an unwrap image reconstruction component to reconstruct an unwrap image using the voxels stored in the first storage component.

20. (original) The imaging system of claim 15, wherein the neighborhood identifier identifies six neighboring voxels in a first iteration.

21. (original) The imaging system of claim 15, wherein the phase adjustment component comprises:

a phase difference calculator to calculate a phase difference value for each respective neighboring voxel, wherein the phase difference value is the difference in phase value of the respective neighboring voxel and the voxel of interest; and

an adjusted phase value calculator to perform computations to correct phase values, wherein the computations comprise:

adding 2Π to the phase value of the neighboring voxel, if the respective phase difference value corresponding to the respective neighboring voxel is less than $-\Pi$;

subtracting 2Π from the phase value of the neighboring voxel, if the respective phase difference value corresponding to the respective neighboring voxel is greater than Π; and

making no change to the phase value of the neighboring voxel, if the respective phase difference value corresponding to the neighboring voxels is between $-\Pi$ to $+\Pi$.

22. (original) The imaging system of claim 15, wherein the respective absolute phase difference value comprises an absolute difference between the phase value of each of the respective neighboring voxel and the phase value of the voxel of interest.

23. (original) The imaging system of claim 15, wherein the voxel of interest selector selects respective voxel only once as the voxel of interest.

24. (original) The imaging system of claim 15, wherein the phase unwrap component is configured to exclude in successive iterations the neighboring voxels tagged as visited voxels.

25. (cancelled).

26. (currently amended) A system for providing an unwrap phase image comprising:

a phase wrapped image source configured to provide a phase wrapped image including a volume of interest within the wrapped image; and

a phase unwrap component configured to perform phase unwrapping in the volume of interest of the wrapped image to obtain a phase unwrapped image,

~~The system of claim 25,~~ wherein the phase unwrap component comprises:

a volume of interest selector to select the volume of interest from the wrapped image;

a voxel of interest selector to select successively voxels of interest from a plurality of voxels in the volume of interest, wherein each voxel of interest comprises a corresponding phase value;

a neighborhood identifier to identify neighboring voxels in a neighborhood of the voxel of interest, wherein each neighboring voxel comprises a respective phase value;

a phase adjustment component to adjust the respective phase values of the neighboring voxels to correct for phase jumps, wherein each of the neighboring voxels is assigned a respective adjusted phase value;

an absolute phase difference determiner to determine respective absolute phase difference values corresponding to each of respective neighboring voxels;

a sort and select component to sort the absolute phase difference values and to select a minimum absolute phase difference value; and

a tagging component to tag the voxel of interest and the neighboring voxels at an end of each iteration as visited voxels, wherein the phase unwrap component is configured to undertake a plurality of iterations till all voxels in the volume of interest are tagged as visited voxels.

27. (original) The system of claim 26, wherein the voxel of interest selector selects a new voxel of interest in each iteration; wherein the new voxel of interest corresponds to the minimum absolute phase difference value selected by the sort and select component.

28. (original) The system of claim 26 further comprising a first storage component to store the voxels with the adjusted phase values.

29. (original) The system of claim 26 further comprising a second storage component to store the absolute phase difference values.

30. (original) The system of claim 28 further comprising an unwrap image reconstruction component to reconstruct an unwrap image using the voxels stored in the first storage component.

31. (original) The system of claim 26, wherein the neighborhood identifier identifies six neighboring voxels in a first iteration.

32. (original) The system of claim 26, wherein the phase adjustment component comprises:

a phase difference calculator to calculate a phase difference value for each respective neighboring voxel, wherein the phase difference value is the difference in the phase value of the respective neighboring voxel and the voxel of interest; and

an adjusted phase value calculator to perform computations to correct phase values, wherein the computations comprise:

adding 2Π to the phase value of the neighboring voxel, if the respective phase difference value corresponding to the respective neighboring voxel is less than $-\Pi$;

subtracting 2Π from the phase value of the neighboring voxel, if the respective phase difference value corresponding to the respective neighboring voxel is greater than Π; and

making no change to the phase value of the neighboring voxel, if the respective phase difference value corresponding to the neighboring voxel is between $-\Pi$ to $+\Pi$.

33. (original) The system of claim 26, wherein the respective absolute phase difference values comprise an absolute difference between phase value of each of a respective neighboring voxel and the phase value of the voxel of interest.

34. (original) The system of claim 26, wherein the voxel of interest selector selects a respective voxel only once as the voxel of interest.

35. (original) The system of claim 26, wherein the phase unwrap component is configured to exclude in successive iterations the neighboring voxels tagged as visited voxels.

36. (original) A computer readable medium for storing computer instructions for three dimensional phase unwrapping for use in imaging applications, the computer instructions comprising:

a) selecting a voxel of interest from a plurality of voxels in a volume of interest of an image, wherein the voxel of interest has a predetermined phase value;

b) identifying neighboring voxels in a neighborhood of the voxel of interest wherein each of neighboring voxels has a respective phase value;

c) adjusting the respective phase values of the neighboring voxels to correct for phase jumps, wherein each of the neighboring voxels is assigned a respective adjusted phase value;

d) determining respective absolute phase difference values corresponding to each of respective neighboring voxels;

e) sorting the respective absolute phase difference values to select a smallest absolute phase difference value;

f) tagging the voxel of interest as visited voxel;

g) tagging the neighboring voxels as visited voxels;

h) selecting a new voxel of interest corresponding to the smallest absolute phase difference value;

i) identifying new neighboring voxels in the neighborhood of the new voxel of interest;

j) repeating steps c through i in successive iterations until all voxels in the volume of interest have been tagged as visited voxels, wherein the neighboring voxles are new neighboring voxels in the successive iterations and wherein the voxel of interest is the new voxel of interest in the successive iterations; and

k) displaying a phase unwrapped image.

37. (original) The computer readable medium of claim 36, wherein computer instructions for adjusting the neighboring voxels to correct for phase jumps comprise:

calculating a phase difference value for each respective neighboring voxel, wherein the phase difference value is the difference in phase value of the respective neighboring voxel and the voxel of interest;

adding 2Π to the phase value of the neighboring voxel, if the respective phase difference value corresponding to the respective neighboring voxel is less than $-\Pi$;

subtracting 2Π from the phase value of the neighboring voxel, if the respective phase difference value corresponding to the respective neighboring voxel is greater than Π; and

making no change to the phase value of the neighboring voxel, if the respective phase difference value corresponding to the neighboring voxels is between $-\Pi$ to $+\Pi$.

38. (original) The computer readable medium of claim 36, wherein the respective absolute phase difference values comprise an absolute difference between phase value of each of the respective neighboring voxel and the phase value of the voxel of interest.

39. (original) The computer readable medium of claim 36, wherein a first iteration comprises selecting six neighboring voxels in the neighborhood of voxel of interest.

40. (original) The computer readable medium of claim 36, wherein computer instructions for selecting the voxel of interest comprise selecting a respective voxel only once as the voxel of interest.

41. (original) The computer readable medium of claim 36 further comprising computer instructions for excluding adjusting phase values of the neighboring voxels tagged as visited voxels in successive iterations.

42. (original) The computer readable medium of claim 36 further comprising computer instructions for storing the adjusted phase values of the neighboring voxels.

43. (original) The computer readable medium of claim 36 further comprising computer instructions for storing the respective absolute phase difference values.

44. (original) A phase unwrapped image created by the computer instructions of claim 36.